Machine Learning for Aiding Meningitis Diagnosis in Pediatric Patients

Authors : Karina Zaccari, Ernesto Cordeiro Marujo

Abstract : This paper presents a Machine Learning (ML) approach to support Meningitis diagnosis in patients at a children’s hospital in Sao Paulo, Brazil. The aim is to use ML techniques to reduce the use of invasive procedures, such as cerebrospinal fluid (CSF) collection, as much as possible. In this study, we focus on predicting the probability of Meningitis given the results of a blood and urine laboratory tests, together with the analysis of pain or other complaints from the patient. We tested a number of different ML algorithms, including: Adaptative Boosting (AdaBoost), Decision Tree, Gradient Boosting, K-Nearest Neighbors (KNN), Logistic Regression, Random Forest and Support Vector Machines (SVM). Decision Tree algorithm performed best, with 94.56% and 96.18% accuracy for training and testing data, respectively. These results represent a significant aid to doctors in diagnosing Meningitis as early as possible and in preventing expensive and painful procedures on some children.

Keywords : machine learning, medical diagnosis, meningitis detection, pediatric research

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